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The Japanese plant collection of Engelbert Kaempfer (1651–1716) in the Sir Hans Sloane Herbarium at The Natural History Museum, London

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SYNOPSIS. The German physician Engelbert Kaempfer (1651–1716) was one of the first Europeans to be employed by the Dutch East India Company as a company surgeon at Nagasaki in Japan. His two-year stay (1691–1692) afforded him an opportunity to study the Japanese flora and he collected more than four hundred specimens, which are now preserved as volume HS 211 of the Sloane Herbarium at The Natural History Museum in London. As a further result of his botanical studies he published the descriptions of about five hundred Japanese plants in his work '*Amoenitatum exoticarum* [...], fasc. V' in 1712 and made more than two hundred, mostly unpublished, drawings of Japanese plants. Kaempfer's plant collection is historically very important as a first European record of the Japanese flora and it is an essential element for the understanding of his botanical work in Japan. The collection has now been thoroughly studied and a database of his specimens in volume HS 211 has been created as part of an ongoing project to digitize historical collections at The Natural History Museum. A provisional identification catalogue of all the specimens in HS 211 is provided here and the complete database will be available on the NHM web site in the near future.

INTRODUCTION

Engelbert Kaempfer was born 15 September 1651 in Lemgo, Germany. After his university studies of law and medicine in Poland and Sweden he travelled in 1683 to Russia and Persia (now Iran), where he stayed until 1688. The Persian plant specimens in volume HS 211 (fol. 107–fol. 109) of the Sloane Herbarium were probably collected during this period.

Kaempfer arrived in Japan on 26 September 1691 by way of India, Ceylon (now Sri Lanka), and Java. He had been offered employment by the Dutch East India Company as a company surgeon and stayed until 31 October 1692. During the Edo period Japan was closed to foreigners, but employees of the Dutch East India Company were allowed to stay in Deshima, a trading post situated on an artificial island in Nagasaki Harbour. Although normally he would have been obliged to remain in Deshima, as a company surgeon Kaempfer twice had the opportunity to accompany the shogun to Edo, the Tokyo of today.

Geographical, topographical, and cultural observations were strictly prohibited, but Kaempfer's botanical interest was supported by the Japanese. He collected specimens, prepared drawings, and took copious notes on the Japanese flora. Fortunately when he left Japan, he succeeded in taking his plant collection, as well as his manuscripts, back to Europe.

Travelling via Java and South Africa on his journey to Europe, he arrived one year later in Leyden (Leiden, The Netherlands), where he finally wrote his thesis in medicine. It is possible that Kaempfer's collection of European plants, arranged as a study herbarium, may have been prepared during his stay at the University of Leiden. This collection is kept in volume HS 213 of the Sloane Herbarium at The Natural History Museum, London.

Engelbert Kaempfer passed his last years in his home town of Lemgo as a physician, while also working on his manuscripts. For a detailed appreciation of Engelbert Kaempfer's life and work, see Haberland (1996).

KAEMPFER'S PUBLICATIONS AND MANUSCRIPTS ON THE JAPANESE FLORA

Together with his plant collection, Engelbert Kaempfer left behind an extensive collection of manuscripts, drawings, and objects from his travels. After his death, Sir Hans Sloane became interested in these manuscripts and collections and acquired them from Kaempfer's nephew (Dandy, 1958: 145).

Today, Kaempfer's manuscripts are housed at the British Library, Department of Manuscripts, and his plant collections are kept at The Natural History Museum, London as part of the Sloane Herbarium

(HS 211 and HS 213). Several of his extensive manuscripts (for example, SI 74, SI 2907, SI 2914, and SI 2915) concern Japanese botany, one being of particular interest, namely his drawings of Japanese plants (SI 2914). This volume, entitled '*Delineatio plantarum japonicarum*' contains 217 folios, mostly with Japanese plant names and references to Kaempfer's publication '*Amoenitatum exoticarum* [...], fasc. V' (1712) by J.G. Scheuchzer (Dandy, 1958: 145). Fifty of these detailed drawings were selected and published posthumously by Banks (1791).

Clearly Kaempfer's most important work on the Japanese flora is his publication of over five hundred plant descriptions in '*Amoenitatum exoticarum* [...], fasc. V' (1712), where he provided the Chinese characters, the Latin transcriptions of the Japanese plant names, and fairly detailed Latin descriptions. For an annotated reprint of Kaempfer's flora of Japan, see Muntzschick (1983). In his descriptions of Japanese plants Kaempfer frequently referred to European species. He is believed to have used his collection of European specimens collected in Leiden, The Netherlands (HS 213: '*Plants gathered in the gardens of Leyden by Dr. Engelbert Kaempfer*') for these comparisons.

An extensive historical-critical edition of Kaempfer's flora of Japan has been in preparation since 1992 at the Institut für Geschichte der Naturwissenschaften at the Ludwig-Maximilians-Universität, Munich (Germany) by Professor Brigitte Hoppe, the author of this paper being responsible for all botanical comments.

KAEMPFER'S COLLECTION OF JAPANESE PLANTS

The volume of Engelbert Kaempfer's Japanese plant collection (HS 211) is one of the most important in the Sloane Herbarium as his records are basic to the study of the flora of Japan (Dandy, 1958: 144–145). The volume contains 410 specimens on 111 folio sheets (Fig. 1). It is entitled '*Volumen plantarum in Japonia collectarum ab Engelberto Kempfero M. D. annis 1691 & 1692. Addita sub finem plantae aliquot ab eodem in Persia & Insula Ceylan repertae*' by M. Maty (1718–1776), Principal Librarian at the British Museum in 1757. The specimens of each folio have been numbered by a previous revisor, probably D.C. Solander.

Several species are represented by a number of specimens on different sheets of the herbarium; for example, *Amelanchier asiatica* (Siebold & Zucc.) Endl. (HS 211: 11. 2, 37. 5, 39. 1, 74. 4, 77. 8, 89. 1, ?90. 1). All specimens are Japanese plants, except those on fol. 107–fol. 109 from Persia (Iran) and those on fol. 110 from Ceylon (Sri Lanka). Many specimens are on small, probably original sheets affixed to larger ones of the Sloane volume (for example, fol. 24, fol. 26–fol. 36, fol. 108, and fol. 111). Several bear names in E. Kaempfer's hand. Some specimens have original labels written by E. Kaempfer which unfortunately are often illegible (for example, fol. 6, fol. 7, fol. 55, and fol. 69).

Table 1 Information recorded in the database of the Kaempfer herbarium.

Category of information	Description	Fields
Consecutive number	A running number used to distinguish each specimen or position of missing specimen in the volume.	Consecutive number
Position number (HS 211)	Folio number followed by a number indicating the specimen's position on the page, probably added by D.C. Solander.	Position number (HS 211)
Determination	Family, genus and, if possible, species with its authority. The identifications follow as far as possible the taxonomy of Ohwi, <i>Flora of Japan</i> (1965) and probably Zander (1994). Any uncertainty is indicated by a question-mark to the left of the identification.	Family, Genus, Species, Authority
Determinavit	The determiner.	Determinavit
Duplicates	Denotes species represented by a number of specimens on different folios of the herbarium.	Duplicates
Annotations	These are in chronological order. All of them are copied literally and their authors are identified if possible.	
Annotation 1	Shows if an original label written by E. Kaempfer is present.	Annotation 1
Annotation 2	Indicates references written by J.G. Scheuchzer to Kaempfer's manuscript of drawings (SI 2914).	Annotation 2
Annotation 3	Indicates references written by J.G. Scheuchzer to Ray's (1686–1704) <i>Historia plantarum</i> .	Annotation 3
References to Ray's <i>Historia plantarum</i>	All references to Ray's <i>Historia plantarum</i> (1686–1704) are indicated and the original citation in the copy of the Botany Library at The Natural History Museum is quoted. The author of these annotations seems to be J. Amman.	RAY, Hist. Pl. (text): RAY, Hist. Pl. (manu):
Locality	Indicates that the specimens come essentially from Japan with the exceptions quoted from Persia and Ceylon.	Locality
Correspondence to E. Kaempfer's other works	Reference to Kaempfer's (1712) publication, <i>Amoenitatum exoticarum</i> [...], fasc. V, (Am. Ex.) with the page number on which the species is described and secondly the number attributed to this plant description.	Am. Ex. (page): Am. Ex. (number):
Correspondence to drawings	Shows the correspondence of the herbarium specimen to an original drawing of Engelbert Kaempfer in his manuscripts (SI 2914). These drawings are referred to by Roman numerals [SI 2914 (page, Rom.):] and by Arabic numerals [SI 2914 (page, Arab.):].	SI 2914 (page, Rom.): SI 2914 (page, Arab.):
Comments	Indicates any particularity of the specimen, for example its position on an original herbarium sheet or the legibility of Kaempfer's label. Relevant remarks on synonyms may also be here.	Comments

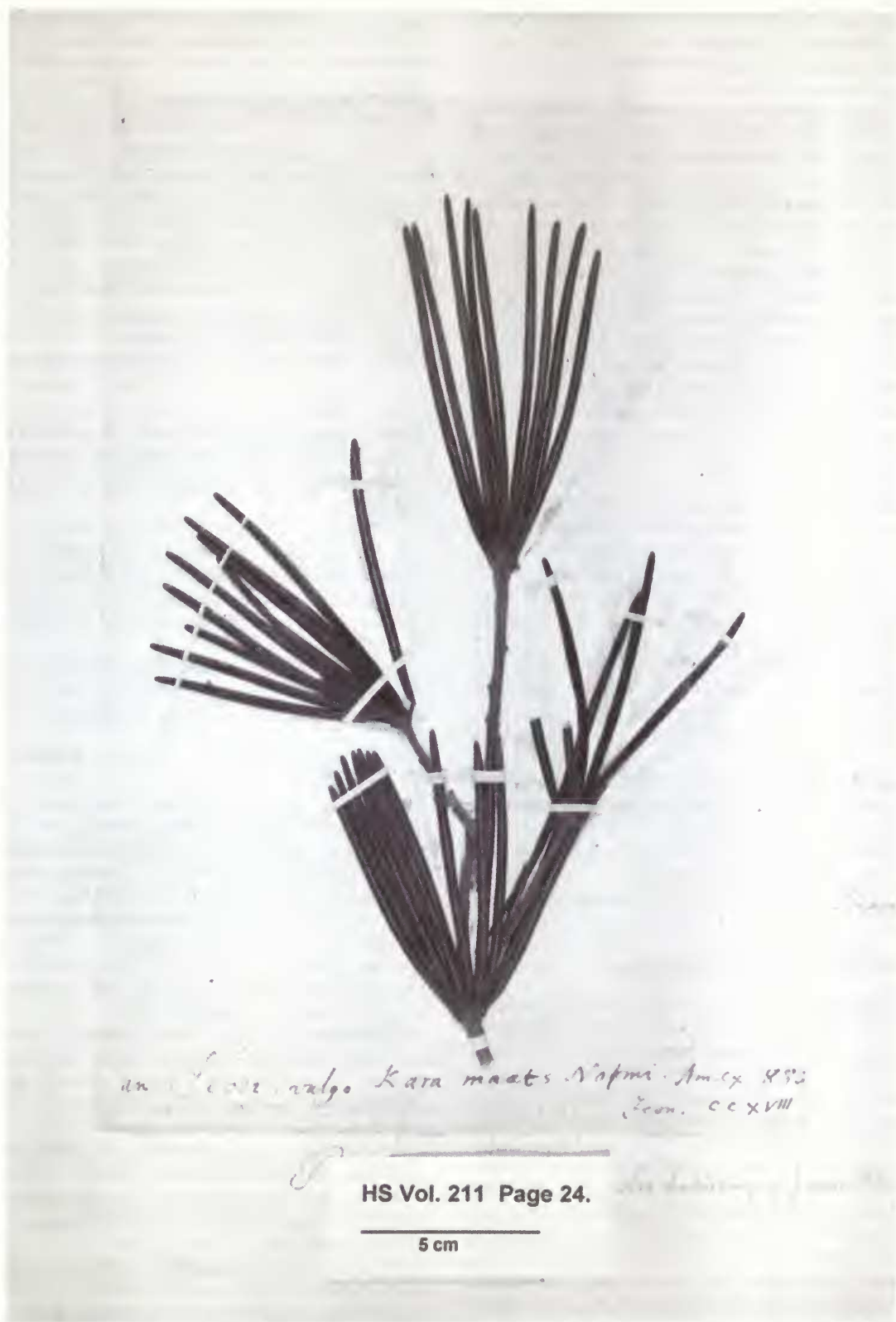


Fig. 1 *Sciadopitys verticillata* (Thunb.) Siebold & Zucc., *Taxodiaceae* (HS 211: 24. 0).

The first examiners of Engelbert Kaempfer's plant collection were J.G. Scheuchzer (1684–1738) and J. Amman (1707–1741). Many specimens are referred to Ray's, *Historia plantarum* (1686–1704) by J. Amman. J.G. Scheuchzer was Sir Hans Sloane's amanuensis and translated E. Kaempfer's 'The history of Japan' from the High German manuscript into English, which was first published in London in 1727. Most of the specimens are named by D.C. Solander (1733–1782); from fol. 1 to fol. 44 each specimen is labelled individually; from fol. 45 onwards the identifications of all specimens on one folio are gathered on one label. Undetermined specimens have been annotated with the symbol '0' by Solander.

Some annotations indicate that C.P. Thunberg (1743–1828), who inspected Kaempfer's collection in 1778 (Dandy, 1958: 145), helped Solander to identify certain specimens. See, for example, HS 211: fol. 45. 1, where Solander wrote 'Thunberg not knew'. It is possible that some of the specimens in this volume (HS 211) were originally from Thunberg's collection of Japanese plants (for example, HS 211: fol. 3. 4, 40. 1). C.P. Thunberg had held the same position in Japan at the Dutch East India Company as Kaempfer and he published an extensive flora with reference to Kaempfer's descriptions (Kaempfer, 1712) with a separate identification catalogue of Kaempfer's descriptions called '*Kaempferus illustratus*' as an annex (Thunberg, 1784).

Particular specimens were later revised by several botanists, among the most important of which were R.A. Salisbury (1761–1829), Ph. F. von Siebold (1796–1866), and W. Munro (1818–1889).

At the beginning of the nineteenth century the Coniferae collected by Kaempfer were the subject of a paper by Salisbury (1817), who wrote his identification next to each specimen, while J. Britten indicated the reference to this paper.

Ph. F. von Siebold, who also had an opportunity to study the flora in Japan and had published a flora of the country (Siebold & Zuccarini, 1835–1870), studied Kaempfer's collection and annotated several specimens (for example, in HS 211: 25. 3, 48. 2, 50. 3, 58. 4, 59. 3).

In his monograph of the Bambusoideae, Munro (1870) referred to all Kaempfer specimens of this subfamily of Poaceae found in HS 211 (for example, fol. 78, fol. 98, and fol. 99).

Only a few specimens carry modern *determinavit* slips, for example all specimens of the genus *Rhododendron* L. examined by B. Miyazawa in 1926 and specimens of the genus *Magnolia* L. studied by J.E. Dandy.

Database of the Kaempfer herbarium

This database has been created to provide a searchable record of information on Kaempfer's specimens and associated sources and will include a series of digital images of each specimen in volume HS 211. It includes a current identification of each specimen as far as possible, as well as all previous annotations or determinations. The information recorded in the database and the fields included are summarized in Table 1.

Whilst there are a number of inconsistencies and omissions concerning determinations of the specimens and identification of the author's handwriting in the database, checking of data is continuing. It is hoped that the future publication of this database and images on the web site of The Natural History Museum [http://www.nhm.ac.uk/botany/databases] will encourage further annotation by specialists to complete the taxonomic identity of this historically and scientifically important herbarium.

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APPENDIX: PROVISIONAL IDENTIFICATION CATALOGUE OF SPECIMENS IN VOLUME HS 211 OF THE SIR HANS SLOANE HERBARIUM BM(S)

Note: The first number indicates the folio number of the volume, the second number following the full-stop indicates the position number of the specimen on the folio attributed by D.C. Solander. A question-mark to the left of an identification indicates an uncertain determination.

The pteridophytes have been identified by J. Camus and A.M. Paul and specimens of the genus *Rhododendron* L. by B. Miyazawa; other specimens have mostly been identified by P.-A. Hinz.

1. 1: ?*Cyathea fauriei* (H. Christ) Copel. (Cyatheaceae)
1. 2: Pteridophyta
2. 0: *Adiantum monochlamys* Eaton (Pteridaceae)
3. 1: *Polygonum chinense* L. (Polygonaceae)
3. 2: *Achyranthes japonica* (Miq.) Nakai (Amaranthaceae)
3. 3: *Lygodium japonicum* (Thunb.) Sw. (Schizaeaceae)
4. 3: *Asplenium incisum* Thunb. (Aspleniaceae)
4. 1: *Lunathyrium japonicum* (Thunb.) Sa. Kurata (Dryopteridaceae)
4. 2: *Ziziphus jujuba* Mill. (Rhamnaceae)
4. 3: Asteraceae
4. 4: *Sphenomeris chinensis* (L.) Maxon (Dennstaedtiaceae)
5. 1: *Rhus javanica* L. (Anacardiaceae)
5. 2: *Rhus verniciflua* Stokes (Anacardiaceae)
5. 3: *Phlegopteris decursive-pinnata* (H.C. Hall) Fée (Thelypteridaceae)
6. 1: *Juniperus chinensis* L. (Cupressaceae)
6. 2: *Thuja orientalis* L. (Cupressaceae)
6. 3: *Chamaecyparis pisifera* (Siebold & Zucc.) Endl. (Cupressaceae)
6. 4: *Juniperus chinensis* L. (Cupressaceae)
7. 1: *Cryptomeria japonica* (L.f.) D. Don (Taxodiaceae)
7. 2: *Cryptomeria japonica* (L.f.) D. Don 'Elegans' (Taxodiaceae)
7. 3: *Thuja orientalis* L. (Cupressaceae)
8. 1: *Thujopsis dolabrata* (Thunb. ex L.f.) Siebold & Zucc. (Cupressaceae)
8. 2: *Pieris japonica* (Thunb.) D. Don (Ericaceae)
8. 3: *Rhododendron indicum* (L.) Sweet (Ericaceae)
9. 1: *Quercus dentata* Thunb. (Fagaceae)
9. 2: *Shortia soldanelloides* (Siebold & Zucc.) Makino (Diapensiaceae)

9. 3: *Abies firma* Siebold & Zucc. (Pinaceae)
 9. 4a: *Stachyurus praecox* Siebold & Zucc. (Stachyuraceae)
 9. 4b: *Forsythia suspensa* (Thunb.) Vahl (Oleaceae)
 10. 1: *Cephalotaxus harringtonia* (Knight) K. Koch (Cephalotaxaceae)
 10. 2: *Cryptomeria japonica* (L.f.) D. Don 'Elegans' (Taxodiaceae)
 10. 3: *Juniperus rigida* Siebold & Zucc. (Cupressaceae)
 10. 4: *Albizia julibrissin* Durazz. (Fabaceae)
 10. 5: *Veronica linariifolia* Pall. (Scrophulariaceae)
 11. 1: *Juniperus rigida* Siebold & Zucc. (Cupressaceae)
 11. 2: *Amelanchier asiatica* (Siebold & Zucc.) Endl. (Rosaceae)
 11. 3: *Chaenomeles japonica* (Thunb.) Lindl. (Rosaceae)
 11. 4: *Aesculus turbinata* Blume (Hippocastanaceae)
 12. 1: *Cryptomeria japonica* (L.f.) D. Don (Taxodiaceae)
 12. 2: *Artemisia indica* Willd. (Asteraceae)
 12. 3: *Juniperus rigida* Siebold & Zucc. (Cupressaceae)
 13. 1: *Juniperus rigida* Siebold & Zucc. (Cupressaceae)
 13. 2: *Juniperus rigida* Siebold & Zucc. (Cupressaceae)
 13. 3: *Aucuba japonica* Thunb. (Cornaceae)
 14. 1a: *Paulownia tomentosa* (Thunb.) Steud. (Scrophulariaceae)
 14. 1b: *Kerria japonica* (L.) DC. (Rosaceae)
 14. 2: *Juniperus rigida* Siebold & Zucc. (Cupressaceae)
 15. 1: *Aphananthe aspera* (Thunb.) Planch. (Ulmaceae)
 15. 2: *Spiraea prunifolia* Siebold & Zucc. (Rosaceae)
 15. 3: *Selaginella pachystachys* Koidz. (Selaginellaceae)
 15. 4: *Forsythia suspensa* (Thunb.) Vahl (Oleaceae)
 16. 1: ?*Selaginella tamariscina* (P. Beauv.) Spring (Selaginellaceae)
 16. 2: ?*Caesalpinia japonica* Siebold & Zucc. (Fabaceae)
 16. 3: *Rubus commersonii* Poir. (Rosaceae)
 17. 1: ?*Caesalpinia japonica* Siebold & Zucc. (Fabaceae)
 17. 2: *Rhododendron japonicum* Sur. (Ericaceae)
 17. 3: *Ranunculus* sp. (Ranunculaceae)
 17. 4: *Ligustrum ibota* Siebold & Zucc. (Oleaceae)
 18. 1: *Juniperus chinensis* L. (Cupressaceae)
 18. 2: *Abelia spathulata* Siebold & Zucc. (Caprifoliaceae)
 18. 3: *Trachelospermum* sp. (Apocynaceae)
 18. 4: *Deutzia scabra* Thunb. (Saxifragaceae)
 18. 5: ?*Bletilla striata* (Thunb.) Rchb.f. (Orchidaceae)
 18. 6: ?*Euphorbia helioscopia* L. (Euphorbiaceae)
 18. 7: ?*Echinochloa crus-galli* (L.) P. Beauv. (Poaceae)
 19. 1: *Pieris japonica* (Thunb.) D. Don (Ericaceae)
 19. 2: ?Rosaceae or ?Symlocaceae
 19. 3: *Thuja orientalis* L. (Cupressaceae)
 20. 1: *Cinnamomum japonicum* Siebold (Lauraceae)
 20. 2: *Juniperus rigida* Siebold & Zucc. (Cupressaceae)
 20. 3: *Rhus succedanea* L. (Anacardiaceae)
 21. 0: *Cephalotaxus harringtonia* (Knight) K. Koch (Cephalotaxaceae)
 22. 1: *Torreya nucifera* (L.) Siebold & Zucc. (Taxaceae)
 22. 2: ?*Ilex rotunda* Thunb. or ?*Ilex integra* Thunb. (Aquifoliaceae)
 23. 1: *Cycas revoluta* Thunb. (Cycadaceae)
 23. 2a: *Camellia japonica* L. (Theaceae)
 23. 2b: *Trochodendron aralioides* Siebold & Zucc. (Trochodendraceae)
 24. 0: *Sciadopitys verticillata* (Thunb.) Siebold & Zucc. (Taxodiaceae)
 25. 1: *Podocarpus macrophyllus* (Thunb.) Sweet (Podocarpaceae)
 25. 2: ?*Pinus parviflora* Siebold & Zucc. (Pinaceae)
 25. 3: *Deutzia crenata* Thunb. (Saxifragaceae)
 25. 4: ?*Quercus dentata* Thunb., hybrid (Fagaceae)
 26. 0: *Smilax china* L. (Smilacaceae)
 27. 1: *Hibiscus tiliaceus* L. (Malvaceae)
 27. 2: *Camellia sinensis* (L.) Kuntze (Theaceae)
 28. 1: *Pteris multifida* Poir. (Pteridaceae)
 28. 2: ?Caprifoliaceae
 28. 3: *Artemisia indica* Willd. (Asteraceae)
 28. 4: ?*Gnaphalium japonicum* Thunb. (Asteraceae)
 29. 1: *Viola* sp. (Violaceae)
 29. 2: *Oxalis corniculata* L. (Oxalidaceae)
 29. 3: *Trachelospermum jasminoides* (Lindl.) Lem. (Apocynaceae)
 30. 1: *Hydrangea scandens* (L.f.) Ser. (Saxifragaceae)
 30. 2: *Rhus succedanea* L. (Anacardiaceae)
 31. 0: *Broussonetia papyrifera* (L.) L'Hér. ex Vent. (Moraceae)
 32. 1: *Machilus thunbergii* Siebold & Zucc. (Lauraceae)
 32. 2: *Camellia japonica* L. (Theaceae)
 32. 3: ?Myrtaceae
 33. 0: *Nandina domestica* Thunb. (Berberidaceae)
 34. 0: *Euonymus alatus* (Thunb.) Siebold (Celastraceae)
 35. 0: *Campsis grandiflora* (Thunb.) K. Schum. (Bignoniaceae)
 36. 1: *Zanthoxylum piperitum* DC. (Rutaceae)
 36. 2: *Sium sisarum* L. (Apiaceae)
 37. 1: *Quercus serrata* Thunb. (Fagaceae)
 37. 2: *Eurya emarginata* (Thunb.) Makino (Theaceae)
 37. 3: Indet.
 37. 4: Indet.
 37. 5: *Amelanchier asiatica* (Siebold & Zucc.) Endl. (Rosaceae)
 38. 1: ?*Sambucus sieboldiana* Blume (Caprifoliaceae) or ?*Rhus trichocarpa* Miq. (Anacardiaceae)
 38. 2: *Rhus succedanea* L. (Anacardiaceae)
 38. 3: *Pieris japonica* (Thunb.) D. Don (Ericaceae)
 39. 1: *Amelanchier asiatica* (Siebold & Zucc.) Endl. (Rosaceae)
 39. 2: ?*Quercus glauca* Thunb. (Fagaceae)
 39. 3: *Rhododendron* sp. (Ericaceae)
 39. 4: *Kerria japonica* (L.) DC. (Rosaceae)
 40. 1: ?*Disporum sessile* D. Don or ?*D. smilacinum* A. Gray (Liliaceae)
 40. 2: ?Rosaceae or ?Primulaceae
 40. 3: *Pittosporum tobira* (Thunb.) W.T. Aiton (Pittosporaceae)
 41. 1: *Corydalis decumbens* (Thunb.) Pers. (Papaveraceae)
 41. 2: *Podocarpus nagi* (Thunb.) Makino (Podocarpaceae)
 42. 1: *Corydalis incisa* (Thunb.) Pers. (Papaveraceae)
 42. 2: ?*Spiraea thunbergii* Siebold or ?*S. prunifolia* Siebold & Zucc. (Rosaceae)
 42. 3: ?*Prunus glandulosa* Thunb. (Rosaceae)
 42. 4: *Euonymus alatus* (Thunb.) Siebold (Celastraceae)
 42. 5: *Stellaria media* (L.) Vill. (Caryophyllaceae)
 43. 1: *Paulownia tomentosa* (Thunb.) Steud. (Scrophulariaceae)
 43. 2: *Corydalis incisa* (Thunb.) Pers. (Papaveraceae)
 43. 3: ?*Spiraea thunbergii* Siebold or ?*S. prunifolia* Siebold & Zucc. (Rosaceae)
 43. 4: ?*Laurus latifolia* Thunb. (Lauraceae) or ?Aquifoliaceae
 44. 1: Indet.
 44. 2: ?*Spiraea thunbergii* Siebold or ?*S. prunifolia* Siebold & Zucc. (Rosaceae)
 44. 3: ?Apiaceae
 44. 4: *Stachyurus praecox* Siebold & Zucc. (Stachyuraceae)
 44. 5: *Smilax china* L. (Smilacaceae)
 44. 6: *Corydalis decumbens* (Thunb.) Pers. (Papaveraceae)
 45. 1: *Acorus gramineus* Aiton (Araceae)
 45. 2: ?Poaceae
 45. 3: *Osmunda japonica* Thunb. (Osmundaceae)
 45. 4: ?*Peucedanum terebinthaceum* (Fisch. ex Trevir.) Fisch. ex Turcz. (Apiaceae)
 46. 1: ?Lauraceae
 46. 2: ?Lauraceae
 46. 3: *Onychium japonicum* (Thunb.) Kunze (Pteridaceae)

46. 4: ?*Apiaceae*
 46. 5: *Acer palmatum* Thunb. (Aceraceae)
 47. 1: ?*Quercus glauca* Thunb. (Fagaceae)
 47. 2: *Spiraea cantoniensis* Lour. (Rosaceae)
 47. 3: ?*Rosaceae*
 47. 4: *Acer palmatum* Thunb. (Aceraceae)
 47. 5: *Kerria japonica* (L.) DC. (Rosaceae)
 48. 1: ?*Arisaema* sp. (Araceae)
 48. 2: *Dicentra spectabilis* (L.) Lem. (Papaveraceae)
 48. 3: *Acer palmatum* Thunb. (Aceraceae)
 49. 1: *Trachelospermum asiaticum* (Siebold & Zucc.) Nakai (Apo-cynaceae)
 49. 2: *Rhus sylvestris* Siebold & Zucc. (Anacardiaceae)
 50. 1: ?*Rubus* sp. (Rosaceae)
 50. 2: Indet.
 50. 3: *Dioscorea quinqueloba* Thunb. (Dioscoreaceae)
 50. 4: *Ilex latifolia* Thunb. (Aquifoliaceae)
 51. 1: *Osmanthus fragrans* (Thunb.) Lour. (Oleaceae)
 51. 2: *Ficus pumila* L. (Moraceae)
 51. 3: *Illicium religiosum* Siebold & Zucc. (Illiciaceae)
 51. 4: Indet.
 52. 1: *Castanopsis cuspidata* (Thunb.) Schottky (Fagaceae)
 52. 2: *Ilex chinensis* Sims (Aquifoliaceae)
 52. 3: *Vaccinium bracteatum* Thunb. (Ericaceae)
 53. 1: *Quercus glauca* Thunb. (Fagaceae)
 53. 2: *Quercus acuta* Thunb. (Fagaceae)
 53. 3: Indet.
 53. 4: *Fatsia japonica* (Thunb.) Decne. & Planch. (Araliaceae)
 54. 1: Indet.
 54. 2: *Gardenia jasminoides* J. Ellis (Rubiaceae)
 54. 3: Indet.
 54. 4: *Castanopsis cuspidata* (Thunb.) Schottky (Fagaceae)
 55. 0: *Neolitsea sericea* (Blume) Koidz. (Lauraceae)
 56. 1: *Mallotus japonicus* (Thunb.) Müll.Arg. (Euphorbiaceae)
 56. 2: *Viburnum dilatatum* Thunb. (Caprifoliaceae)
 56. 3: *Corylopsis* sp. (Hamamelidaceae)
 57. 1: Indet.
 57. 2: ?*Spiraea thunbergii* Siebold or ?*S. prunifolia* Siebold & Zucc. (Rosaceae)
 58. 1: *Amelanchier asiatica* (Siebold & Zucc.) Endl. (Rosaceae)
 58. 2: ?*Prunus glandulosa* Thunb. (Rosaceae)
 58. 3: *Eurya japonica* Thunb. (Theaceae)
 58. 4: *Stachyurus praecox* Siebold & Zucc. (Stachyuraceae)
 59. 1: ?*Symplocos lucida* (Thunb. ex Murray) Siebold & Zucc. (Symplocaceae)
 59. 2: *Pittosporum tobira* (Thunb.) W.T. Aiton (Pittosporaceae)
 59. 3: *Myrica rubra* (Lour.) Siebold & Zucc. (Myricaceae)
 59. 4: *Skimmia japonica* Thunb. (Rutaceae)
 60. 1: Indet.
 60. 2: *Zanthoxylum piperitum* (L.) DC. (Rutaceae)
 60. 3: *Illicium religiosum* Siebold & Zucc. (Illiciaceae)
 61. 1: *Acorus gramineus* Aiton (Araceae)
 61. 2: ?*Spiraea prunifolia* Siebold & Zucc. (Rosaceae)
 61. 3: Indet.
 62. 1: *Elaeagnus pungens* Thunb. (Elaeagnaceae)
 62. 2a: ?*Rhododendron kaempferi* Planch. (Ericaceae)
 62. 2b: *Rhododendron scabrum* G. Don (Ericaceae)
 62. 2c: *Rhododendron macrosepalum* Maxim. (Ericaceae)
 62. 3: *Kerria japonica* (L.) DC. (Rosaceae)
 63. 1: *Podocarpus nagi* (Thunb.) Makino (Podocarpaceae)
 63. 2: *Pittosporum tobira* (Thunb.) W.T. Aiton (Pittosporaceae)
 63. 3: *Illicium religiosum* Siebold & Zucc. (Illiciaceae)
 64. 1: ?*Aristolochia* sp. or ?*Asarum* sp. (Aristolochiaceae)
 64. 2: ?*Kadsura japonica* (L.f.) Dunal (Magnoliaceae)
 64. 3: *Gardenia jasminoides* J. Ellis (Rubiaceae)
 64. 4: Indet.
 64. 5: *Rhus javanica* L. (Anacardiaceae)
 65. 1: Indet.
 65. 2: *Centella asiatica* (L.) Urb. (Apiaceae)
 65. 3: Indet.
 65. 4: ?*Lauraceae*
 65. 5: *Gardenia jasminoides* J. Ellis (Rubiaceae)
 65. 6: ?*Lauraceae*
 66. 1: ?*Ligustrum obtusifolium* Siebold & Zucc. or ?*L. ibota* Siebold & Zucc. (Oleaceae)
 66. 2: ?*Lonicera* sp. (Caprifoliaceae)
 66. 3: *Hypericum monogynum* L. (Guttiferae)
 66. 4: *Ternstroemia gymnanthera* (Wight & Arn.) Sprague (Theaceae)
 67. 1: *Stauntonia hexaphylla* Decne. (Lardizabalaceae)
 67. 2: *Lindera sericea* Blume (Lauraceae)
 67. 3: ?*Euonymus sieboldianus* Blume or ?*E. japonicus* L.f. (Celastraceae)
 67. 4: ?*Sophora japonica* L. (Fabaceae)
 68. 1: ?*Rhododendron metternichii* Siebold & Zucc. (Ericaceae)
 68. 2a: Hepaticae
 68. 2b: Musci
 68. 3: ?*Ligustrum sieboldiana* Blume or ?*E. japonicum* Thunb. (Oleaceae)
 68. 4: *Clematis florida* Thunb. (Ranunculaceae)
 69. 1: ?*Lauraceae*
 69. 2: *Quercus serrata* Thunb. (Fagaceae)
 69. 3: *Platycodon grandiflorus* (Jacq.) A.DC. (Campanulaceae)
 70. 0: *Phyllostachys bambusoides* Siebold & Zucc. (Poaceae)
 71. 0: *Nandina domestica* Thunb. (Berberidaceae)
 72. 1: Indet. (from Persia)
 72. 2: Indet. (from Persia)
 72. 3: Indet. (from Persia)
 72. 4: Indet. (from Persia)
 73. 1: *Ficus religiosa* L. (Moraceae, from Persia)
 73. 2: Indet. (from Persia)
 73. 3: Indet. (Fabaceae, from Persia)
 74. 1a: ?*Veronica* sp. (Scrophulariaceae)
 74. 1b: ?*Rhododendron metternichii* Siebold & Zucc. (Ericaceae)
 74. 2: ?*Symplocos glauca* (Thunb.) Koidz. (Symplocaceae)
 74. 3: *Buxus microphylla* Siebold & Zucc. (Buxaceae)
 74. 4: *Amelanchier asiatica* (Siebold & Zucc.) Endl. (Rosaceae)
 74. 5: *Akebia quinata* (Houtt.) Decne. (Lardizabalaceae)
 74. 6: *Elaeagnus pungens* Thunb. (Elaeagnaceae)
 74. 7: Indet.
 74. 8: Pteridophyta
 75. 1: *Lonicera* sp. (Caprifoliaceae)
 75. 2: *Mirabilis jalapa* L. (Nyctaginaceae) or *Jasminum sambac* (L.) Aiton (Oleaceae)
 75. 3: *Rhododendron indicum* (L.) Sweet (Ericaceae)
 75. 4: *Lemmaphyllum microphyllum* C. Presl (Polypodiaceae)
 75. 5: *Paris verticillata* M. Bieb. (Liliaceae)
 75. 6: *Begonia evansiana* Andrews (Begoniaceae)
 76. 1: *Rhus succedanea* L. (Anacardiaceae)
 76. 2: *Daucus carota* L. (Apiaceae)
 76. 3: *Sium sisarum* L. (Apiaceae)
 77. 1: *Solanum nigrum* L. (Solanaceae)
 77. 2: *Deutzia scabra* Thunb. (Saxifragaceae)
 77. 3: Indet.
 77. 4: Indet.
 77. 5: Indet.
 77. 6: ?*Boraginaceae*

77. 7: *Rhododendron mucronatum* (Blume) G. Don (Ericaceae)
 77. 8: *Amelanchier asiatica* (Siebold & Zucc.) Endl. (Rosaceae)
 78. 1: Fabaceae
 78. 2: Indet.
 78. 3: *Rhododendron tamurae* (Makino) Masam. (Ericaceae)
 78. 4: ?*Spiraea thunbergii* Siebold or ?*S. prunifolia* Siebold & Zucc. (Rosaceae)
 78. 5: Indet.
 78. 6: *Bambusa fortunei* Van Houtte (Poaceae)
 78. 7: *Equisetum arvense* L. (Equisetaceae)
 79. 1: *Viburnum plicatum* Thunb. (Caprifoliaceae)
 79. 2a: ?*Magnolia kobus* DC. (Magnoliaceae)
 79. 2b: ?*Magnolia liliiflora* Desr. (Magnoliaceae)
 79. 3: *Spiraea cantoniensis* Lour. (Rosaceae)
 80. 1: *Rhus javanica* L. (Anacardiaceae)
 80. 2: *Ziziphus jujuba* Mill. (Rhamnaceae)
 80. 3: *Weigela coraeënsis* Thunb. (Caprifoliaceae)
 81. 1: *Rhus succedanea* L. (Anacardiaceae)
 81. 2: ?*Polygonum barbatum* L. or ?*P. japonicum* Meisn. (Polygonaceae)
 81. 3: *Aucuba japonica* Thunb. (Cornaceae)
 82. 0: *Rhus verniciflua* Stokes (Anacardiaceae)
 82. 0a: *Polygonum chinense* L. (Polygonaceae)
 83. 1: *Wisteria brachybotrys* Siebold & Zucc. (Fabaceae)
 83. 2: *Orixa japonica* Thunb. (Rutaceae)
 84. 1: *Salix* sp. (Salicaceae)
 84. 2: *Osmunda japonica* Thunb. (Osmundaceae)
 84. 3: ?*Potentilla* sp. (Rosaceae)
 84. 4: ?*Wisteria* sp. (Fabaceae)
 85. 1: *Rhus sylvestris* Siebold & Zucc. (Anacardiaceae)
 85. 2: *Ternstroemia gymnanthera* (Wight & Arn.) Sprague (Theaceae)
 85. 3: ?*Viburnum plicatum* Thunb. (Caprifoliaceae)
 85. 4: Indet.
 86. 1: *Ternstroemia gymnanthera* (Wight & Arn.) Sprague (Theaceae)
 86. 2: Asteraceae
 86. 3: *Polygonatum odoratum* (Mill.) Druce (Liliaceae)
 86. 4: Iridaceae
 87. 1: *Aleurites cordata* (Thunb.) R. Br. (Euphorbiaceae)
 87. 2: *Aleurites cordata* (Thunb.) R. Br. (Euphorbiaceae)
 87. 3: Asteraceae
 87. 4: Fabaceae
 88. 1: ?*Gynura japonicum* (Thunb.) Juel (Asteraceae)
 88. 2: Gymnospermae
 88. 3: ?*Pieris japonica* (Thunb.) D. Don (Ericaceae)
 88. 4: ?Nymphaeaceae
 89. 1: *Amelanchier asiatica* (Siebold & Zucc.) Endl. (Rosaceae)
 89. 2: *Euonymus alatus* (Thunb.) Siebold (Celastraceae)
 89. 3: *Gentiana thunbergii* (G. Don) Griseb. (Gentianaceae)
 89. 4: *Aesculus turbinata* Blume (Hippocastanaceae)
 90. 1: ?*Amelanchier asiatica* (Siebold & Zucc.) Endl. (Rosaceae)
 90. 2: *Stauntonia hexaphylla* Decne. (Lardizabalaceae)
 90. 3: *Buxus microphylla* Siebold & Zucc. (Buxaceae)
 90. 4: Indet.
 91. 1: *Rhus javanica* L. (Anacardiaceae)
 91. 2: *Ginkgo biloba* L. (Ginkgoaceae)
 91. 3: *Damnacanthus indicus* (L.) Gaertn. (Rubiaceae)
 92. 1: ?*Trachycarpus fortunei* (Hook.) H. Wendl. or ?*T. wagnerianus* Becc. (Arecaceae)
 92. 2: ?*Eupatorium fortunei* Turcz. or ?*E. lindleyanum* DC. (Asteraceae)
 92. 3: *Quercus gilva* Blume (Fagaceae)
 93. 1: Apiaceae
 93. 2: ?*Cornus controversa* Hemsl. (Cornaceae)
 93. 3: *Rhus verniciflua* Stokes (Anacardiaceae)
 94. 1: Indet.
 94. 2: *Cryptomeria japonica* (L.f.) D. Don (Taxodiaceae)
 94. 3: *Primula sieboldii* E. Morren (Primulaceae)
 94. 4: ?*Paeonia suffruticosa* Andrews (Ranunculaceae)
 94. 5: ?*Amorphophallus* sp. or ?*Arisaema* sp. (Araceae)
 94. 6: *Camellia sinensis* (L.) Kuntze (Theaceae)
 95. 0: *Clerodendrum trichotomum* Thunb. (Verbenaceae)
 96. 1: *Ficus erecta* L. var. *sieboldii* (Miq.) King (Moraceae)
 96. 2: *Gardenia jasminoides* J. Ellis (Rubiaceae)
 96. 3: *Clematis florida* Thunb. (Ranunculaceae)
 96. 4: ?Asteraceae
 97. 1: ?*Artemisia capillaris* Thunb. or ?*A. schmidtiana* Maxim. (Asteraceae)
 97. 2: ?*Paeonia suffruticosa* Andrews (Ranunculaceae) or ?*Dicentra spectabilis* (L.) Lem. (Papaveraceae)
 97. 3: *Acorus gramineus* Aiton (Araceae)
 97. 4: ?*Laminaria japonica* Areschoug (Laminariaceae)
 97. 5: *Raphia humilis* A. Chev. (Arecaceae)
 98. 0: ?*Phyllostachys bambusoides* Siebold & Zucc. (Poaceae)
 99. 0: ?*Phyllostachys bambusoides* Siebold & Zucc. (Poaceae)
 100. 1: Asteraceae
 100. 2: Asteraceae
 100. 3: ?*Serissa foetida* (L.f.) Poir. ex Lam. (Rubiaceae)
 100. 4: ?*Viburnum dilatatum* Thunb. (Caprifoliaceae)
 100. 5: *Saxifraga stolonifera* Curtis (Saxifragaceae)
 100. 6: ?*Viburnum dilatatum* Thunb. (Caprifoliaceae)
 101. 1: ?*Zea mays* L. (Poaceae)
 101. 2: Apiaceae
 101. 3: Apiaceae
 102. 1: *Gleditsia japonica* Miq. (Fabaceae)
 102. 2: *Kerria japonica* (L.) DC. (Rosaceae)
 102. 3: *Kerria japonica* (L.) DC. (Rosaceae)
 102. 4: *Kerria japonica* (L.) DC. (Rosaceae)
 102. 5: ?*Chaenomeles speciosa* (Sweet) Nakai (Rosaceae)
 103. 1: *Rhododendron mucronatum* (Blume) G. Don (Ericaceae)
 103. 2: ?*Hosta* sp. (Liliaceae)
 103. 3: ?*Viburnum dilatatum* Thunb. (Caprifoliaceae)
 103. 4: *Equisetum arvense* L. (Equisetaceae)
 103. 5: *Ginkgo biloba* L. (Ginkgoaceae)
 103. 6: *Osmunda japonica* Thunb. (Osmundaceae)
 103. 7: Indet.
 103. 8: *Akebia quinata* (Houtt.) Decne. (Lardizabalaceae)
 103. 9: ?*Wisteria* sp. (Fabaceae)
 104. 1: Poaceae
 104. 2: *Pulsatilla cernua* (Thunb.) Bercht. & Opiz (Ranunculaceae)
 104. 3: *Kerria japonica* (L.) DC. (Rosaceae)
 104. 4: Indet.
 104. 5: Indet.
 105. 1: *Dioscorea quinqueloba* Thunb. (Dioscoreaceae)
 105. 2: Indet.
 105. 3: Lauraceae
 105. 4: Indet.
 105. 5: Indet.
 105. 6: ?*Stauntonia hexaphylla* Decne. (Lardizabalaceae)
 105. 7: Indet. (Monocotyledonae)
 105. 8: Indet.
 105. 9: Indet.
 105. 10: ?*Dioscorea japonica* Thunb. (Dioscoreaceae)
 105. 11: *Aristolochia kaempferi* Willd. (Aristolochiaceae)
 105. 12: Indet.
 105. 13: Indet.
 105. 14: *Rhododendron japonicum* Sur. (Ericaceae)

105. 15: *Magnolia* sp. (Magnoliaceae)
105. 16: ?*Rhododendron kaempferi* Planch. (Ericaceae)
105. 17: ?*Paeonia suffruticosa* Andrews (Ranunculaceae)
105. 18: Indet.
106. 1: *Dioscorea* sp. (Dioscoreaceae)
106. 2: Indet.
106. 3: Indet.
106. 4: Indet.
106. 5: ?*Ilex* sp. (Aquifoliaceae) or ?*Osmanthus* sp. (Oleaceae)
106. 6: ?*Wisteria* sp. (Fabaceae)
106. 7: *Ampelopsis brevipedunculata* (Maxim.) Trautv. (Vitaceae)
106. 8: Indet.
107. 0: ?*Ferula assa-foetida* L. (Apiaceae, from Persia)
108. 0: ?*Ferula assa-foetida* L. (Apiaceae, from Persia)
109. 1: ?*Ferula assa-foetida* L. (Apiaceae, from Persia)
109. 2: *Smilax china* L. (Smilacaceae)
109. 3: Orchidaceae
109. 4: ?*Allhagi pseudalhagi* (M. Bieb.) Desv. (Fabaceae, from Persia)
110. 1: *Viburnum plicatum* Thunb. (Caprifoliaceae, from Ceylon)
110. 2: *Ficus* sp. (Moraceae, from Ceylon)
110. 3: ?*Elaeagnus pungens* Thunb. (Elaeagnaceae, from Ceylon)
110. 4: *Viburnum plicatum* Thunb. (Caprifoliaceae, from Ceylon)
110. 5: ?*Clematis* sp. (Ranunculaceae, from Ceylon)
110. 6: ?*Spiraea cantoniensis* Lour. (Rosaceae, from Ceylon)
110. 7: Indet. (from Ceylon)
111. 1: *Phytolacca esculenta* Van Houtte (Phytolaccaceae)
111. 2: *Saxifraga stolonifera* Curtis (Saxifragaceae)